

# GENERATOR FOR A BICYCLE

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention relates to a generator, and more particularly to generator for a bicycle.

### 2. Description of Related Art

To promote bicycle safety when riding a bicycle in the dark, a front light is mounted on a head tube of the bicycle. The power source for the front light is a battery that is mounted on the bicycle. However, the battery needs to be replaced when the battery is exhaust. It is very inconvenient for a rider to exchange the exhausted battery and very dangerous riding in night without lighting device. Consequently, a conventional bicycle generator is provided for supplying power to a lighting device that is mounted on a bicycle. The generators from earlier generations were usually mounted on a rear wheel strut with a geared drive arm in contact with the sidewall of the rear wheel. The drive arm would weaken the wheel sidewall and lead to blowouts. The generator had to be adjusted so that the drive arm made good contact with the wheel sidewall. Because of the gears and linkage between the drive arm and the generator, the generator often had to be repaired or replaced.

The present invention has arisen to mitigate and/or obviate the disadvantages of the conventional power source for the bicycle.

## SUMMARY OF THE INVENTION

The main objective of the present invention is to provide a simplified generator for a bicycle that is driven by the tread surface of a bicycle tire to

1 generate electricity for a light or an audible device to improve the enjoyment  
2 and safety of riding a bicycle.

3 To achieve the objective, the generator for a bicycle in accordance with  
4 the present invention comprises a rotor abutting the tread of a wheel of the  
5 bicycle. A coil is mounted in the rotor and electrically connected to two bearings  
6 that are mounted on the opposite sides of the rotor by two inner wires. A stator  
7 has a shaft extending through the two bearings and a permanent magnet sleeved  
8 onto the shaft and corresponding to the coil. Two metal rings are respectively  
9 sleeved onto opposite ends of the shaft and electrically connected to the bearings.  
10 A light is mounted on the bicycle and electrically connected to the metal ring.  
11 The coil will rotate with the rotor relative to the stator when the bicycle is  
12 moving and generate electricity that is transmitted to the light, and the light  
13 improves the enjoyment and safety of riding the bicycle.

14 Further benefits and advantages of the present invention will become  
15 apparent after a careful reading of the detailed description with appropriate  
16 reference to the accompanying drawings.

#### 17 BRIEF DESCRIPTION OF THE DRAWINGS

18 Fig. 1 is an operational perspective view of a generator for a bicycle in  
19 accordance with the present invention mounted on the bicycle;

20 Fig. 2 is an exploded perspective view of the generator for a bicycle in  
21 Fig. 1;

22 Fig. 3 is a partially exploded perspective view of the generator for a  
23 bicycle in Fig. 1;

24 Fig. 4 is a side plan view of the coil and the permanent magnet in Fig. 2;

1 and

2 Fig. 5 is an operational side plan of the generator for a bicycle when the  
3 bicycle is in use and the light works.

4 DETAILED DESCRIPTION OF THE INVENTION

5 With reference to the drawings and initially to Figs. 1-3, a generator for  
6 a bicycle in accordance with the present invention comprises round rotor (10),  
7 an annular coil (20) secured in the rotor (10) and a stator (30) rotatably  
8 extending through the rotor (10) and the coil (20).

9 The rotor (10) includes two casings (11, 111) abutting each other to  
10 form a chamber (not numbered) in the rotor (10). Each of the two casings (11,  
11 111) includes a first side (not numbered) and a second side. The first side of each  
12 casing (11, 111) abuts the first side of the other casing (11, 111). A recess (16)  
13 centrally is defined in the first side of each casing (11, 111) to align with the  
14 recess in the other casing (11, 111). A hole (12) is centrally defined in each  
15 casing (11, 111) to align with the hole (12) in the other casing (11, 111). The hole  
16 (12) has a diameter smaller than that of the recess (16) and communicates with  
17 the recess (16). The recess (16) includes a bottom having an annular flange (13)  
18 inwardly and radially extending from the bottom of the recess (16) to form a  
19 passage (14) communicating with the hole (12) and the recess (16) so that the  
20 passage (14) has a diameter smaller than that of the hole (12). An indent (131) is  
21 defined in the flange (13) and laterally communicates with the passage (14).  
22 Each first side of the casings (11, 111) has at least one stud (15) perpendicularly  
23 extending from the casing (11, 111) and one bore (151) perpendicularly defined  
24 in the casing (11, 111) to securely receive a corresponding stud (15) to connect

1 the two casings (11, 111). A bearing (17) is securely mounted in the hole (12) in  
2 each casing (11, 111) and abuts the annular flange of the casings (11, 111).

3 The coil (20) comprises two metal covers (201, 202), a coil seat (not  
4 shown), a winding (not shown) and two inner wires (23). The metal covers (201,  
5 202) abut each other to enclose a coil seat (not shown) and are soldered to each  
6 other. The winding (not shown) is wound around the coil seat. Each of the metal  
7 covers (201, 202) has multiple salient poles (21, 22) perpendicularly extending  
8 from the inner periphery of each cover (201, 202) parallel to the axis of rotation  
9 and abutting the inner periphery of the coil seat, such that each cover (201, 202)  
10 will securely attach to one side of the coil seat. The salient poles (21) of the  
11 metal cover (201) correspond to that of the metal cover (202). The two inner  
12 wires (23) are respectively electrically connected to the two metal covers (201,  
13 202) and extend into the hole (12) through the indent (131). The end of the inner  
14 wire (23) in the hole (12) is electrically connected to the outer periphery of the  
15 bearing (17), such that the bearing (17) is further used as a collector.

16 The stator (30) comprises an insulating shaft (32), an annular flange (31)  
17 and a ring of permanent magnets (35). The insulating shaft (32) rotatably  
18 extends through the coil (20) and has two opposite ends secured in the bearings  
19 (17) of the rotor (10). The annular flange (31) radially extends outwardly from  
20 the middle portion of the shaft (32). The ring of permanent magnets (35) is  
21 mounted on the outer periphery of the annular flange (31). The permanent  
22 magnets (35) correspond to the salient poles (21, 22) in the metal covers (201,  
23 202). Further with reference to Fig. 4, the magnetic poles of the permanent  
24 magnet (35) alternate around the ring of permanent magnets (35). A protrusion

1 (33) extends from two opposite side of the annular flange (31) around the shaft  
2 (32) to abut the middle portion of the bearing (17).

3 An electrical ring connector (40) is mounted on each end of the shaft (32)  
4 and abuts and electrically connects with the middle portion of the bearing (17).  
5 One end of an outer wire (41) is electrically connected to the metal ring (40), and  
6 the other end is adapted to be electrically connected to a light (50) or an audible  
7 device (not shown). With reference top Fig. 5, the light (50) or the audible  
8 device can be mounted anywhere on the frame (70) of the bicycle. The light (50)  
9 can include multiple lights that can be mounted on the fender (60), the handlebar  
10 (73) the fork (74) or the seat (72).

11 With reference to Figs. 1 and 5, the generator for a bicycle in accordance  
12 with the present invention is mounted on the frame (70) of the bicycle near the  
13 wheel (71, 710) of the bicycle by an insulating bracket (61). Accordingly, when  
14 the bicycle is in use and the wheels (71, 710) rotate, the coil (20) will rotate with  
15 the casings (11, 111) relative to the stator (30). The coil (20) windings will cut  
16 through the magnetic line of flux of the permanent magnet (35) and generate  
17 electricity. The electricity will be transmitted to the light or the audible device  
18 through the cover (201, 202), the inner wire (23) connected to the metal cover  
19 (201, 202), the bearing (17), the electrical ring connector (40) and the outer wire  
20 (41) connected to the metal ring (40) to the light (50) or the audible device.  
21 Consequently, the enjoyment of riding the bicycle is improved. In addition, the  
22 light (50) or the audible device provides a warning to other people at night. The  
23 safety of riding the bicycle is also improved.

24 Although the invention has been explained in relation to its preferred

- 1 embodiment, it is to be understood that many other possible modifications and
- 2 variations can be made without departing from the spirit and scope of the
- 3 invention as hereinafter claimed.